

AMENDMENTS TO THE CLAIMS

Claim 1. (currently amended) An end effector for a robot, comprising:
a plate mounted to the robot, said plate having a first surface and an oppositely positioned second surface;
a vacuum port located on the first surface of the plate and passing through the plate to the second surface, said vacuum port being connected to a vacuum source;
a surround located on the second surface of the plate, said surround enveloping the vacuum port at the second surface of the plate;
a first gripping element mounted to the second surface in substantially perpendicular relationship to the plate, said first gripping element being located outboard the surround;
a second gripping element positioned in spaced parallel relation opposite the first gripping element whereby said second gripping element is located outboard the surround, said first and second gripping element being arranged separately and independently from said vacuum port.

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Claim 2. (original) An end effector according to claim 1 wherein the second gripping element is mounted to a moving means, said means being attached to the plate whereby the second gripping element is positioned within a defined range of motion in relation to the first gripping element.

Claim 3. (original) An end effector according to claim 2 wherein the moving means comprises a linear actuator.

Claim 4. (original) An end effector according to claim 1 wherein:
the first gripping element further comprises a first blade having a smooth surface, said first blade being rigidly mounted generally perpendicularly to the plate; and

the second gripping element further comprises a second blade having a smooth surface, said second blade being movably mounted generally perpendicular to the plate.

Claim 5. (original) An end effector according to claim 1 wherein the surround is positioned on the second surface in a substantially rectangular pattern and whereby the surround forms four substantially perpendicularly arranged walls.

Claim 6. (cancelled)

Claim 7. (original) An end effector according to claim 1 further comprising a vacuum sensor, said vacuum sensor being mounted to said plate.

Claims 8-11, inclusive. (cancelled)

Claim 12. (original) An end effector according to claim 1 further comprising a plurality of suction cups, said suction cups being mounted in perpendicular relation to the plate wherein said suction cups selectively draw a vacuum.

Claim 13. (original) An end effector for a robot for manipulating a container, said effector comprising:

a vacuum plenum comprising a mounting plate, a surround mounted to said plate, a port passing through said plate, and a means for drawing vacuum connected to said port;

a first gripping element mounted to the plate outboard of said surround, said first gripping element comprising a stationary blade having a smooth surface, said stationary blade being rigidly mounted generally perpendicularly to the plate; and

a second gripping element comprising a movable blade having a smooth surface, said movable blade being movably mounted generally perpendicular to the plate outboard of said surround, and wherein said movable blade is positioned opposite the first gripping element.

Claim 14. (original) An end effector according to claim 13 wherein the stationary blade includes a first smooth surface, said first smooth surface being outboard of the vacuum plenum, said stationary blade rigidly mounted generally perpendicular to the plate;

said movable blade includes a second smooth surface, said second smooth surface being opposite the stationary blade whereby said first smooth surface faces said second smooth surface; and

said vacuum plenum is positioned between said first smooth surface and said second smooth surface.

Claim 15. (original) An end effector according to claim 13 further comprising a plurality of suction cups located in generally perpendicular relation to the plate and wherein said suction cups are positioned to engage the container, said suction devices being connected to a vacuum means.

Claim 16. (original) An end effector according to claim 13 further comprising a plurality of piercing points, each said point having a barbed portion, said points being retractably mounted to the plate, whereby the plurality of points are adapted to pierce a container.

Claim 17. (original) An end effector according to claim 13 further comprising a vacuum sensor, said vacuum sensor mounted to said plate.

Claim 18. (currently amended) A system for gripping and transferring items from a container, said system comprising:

a supply of items within said container;

an industrial robot with an end effector, said end effector having a plate rotatably mounted to the robot, said plate having a first surface and an oppositely positioned second surface;

a vacuum port located on the first surface of the plate and passing through the plate to the second surface;

a surround located on the second surface of the plate, said surround enveloping the vacuum port at the second surface of the plate;

a first gripping element mounted to the second surface in substantially perpendicular relationship to the plate, said first gripping element being located outboard said surround;

a second gripping element positioned in spaced parallel relation opposite the first gripping element, said second gripping element being located outboard said surround; and

whereby said items are gripped by said end effector, removed from said container and transferred to a predetermined location.

Claim 19. (cancelled)

Claim 20. (new) An end effector for a robot, comprising:

a plate mounted to the robot, said plate having a first surface and an oppositely positioned second surface;

a vacuum port located on the first surface of the plate and passing through the plate to the second surface, said vacuum port being connected to a vacuum source;

a surround located on the second surface of the plate, said surround enveloping the vacuum port at the second surface of the plate, said surround comprises a subframe, said subframe located between the surround and the plate;

a first gripping element mounted to the second surface in substantially perpendicular relationship to the plate, said first gripping element being located outboard the surround;

a second gripping element positioned in spaced parallel relation opposite the first gripping element whereby said second gripping element is located outboard the surround.

Claim 21. (new) An end effector for a robot, comprising:

a plate mounted to the robot, said plate having a first surface and an oppositely positioned second surface;

a vacuum port located on the first surface of the plate and passing through the plate to the second surface, said vacuum port being connected to a vacuum source;

a surround located on the second surface of the plate, said surround enveloping the vacuum port at the second surface of the plate;

a first gripping element mounted to the second surface in substantially perpendicular relationship to the plate, said first gripping element being located outboard the surround;

a second gripping element positioned in spaced parallel relation opposite the first gripping element whereby said second gripping element is located outboard the surround;

a pair of parallel mounting rails positioned substantially perpendicular to the plate, each of said parallel mounting rails having a plurality of vacuum cups mounted thereon whereby said vacuum cups are adapted to selectively apply a vacuum.

Claim 22 (new) An end effector for a robot, comprising:

a plate mounted to the robot, said plate having a first surface and an oppositely positioned second surface;

a vacuum port located on the first surface of the plate and passing through the plate to the second surface, said vacuum port being connected to a vacuum source;

a surround located on the second surface of the plate, said surround enveloping the vacuum port at the second surface of the plate;

a first gripping element mounted to the second surface in substantially perpendicular relationship to the plate, said first gripping element being located outboard the surround;

a second gripping element positioned in spaced parallel relation opposite the first gripping element whereby said second gripping element is located outboard the surround; and

115 → a plurality of piercing points, said points being retractably mounted to the plate.

Claim 23. (new) An end effector according to claim 22 further comprising a plurality of piercing points said points being retractably mounted to the plate.

Claim 24. (new) An end effector according to claim 22 further comprising a plurality of suction cups located on said arm whereby said arm is mounted in substantial perpendicular relation to the plate; and wherein each said suction cups has means for drawing vacuum.

Claim 25. (new) An end effector for a robot for manipulating a container, said effector comprising:

a vacuum plenum comprising a mounting plate, a surround mounted to said plate, a port passing through said plate, and a means for drawing vacuum connected to said port;

a first gripping element mounted to the plate outboard of said surround, said first gripping element comprising a stationary blade having a smooth surface, said stationary blade being rigidly mounted generally perpendicularly to the plate; and

(A3) a second gripping element comprising a movable blade having a smooth surface, said movable blade being movably mounted generally perpendicular to the plate outboard of said surround, and wherein said movable blade is positioned opposite the first gripping element; and

a plurality of piercing points, each said point having a barbed portion, said points being retractably mounted to the plate, whereby the plurality of points are adapted to pierce a container.
